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ABSTRACT

To aid institutions in identifying and using information about educational outcomes, the National Center for Higher Education Management Systems (NCHEMS) developed an "outcome structure," a new system for organizing outcomes and outcomes information for purposes of classification, analysis and decisionmaking. Preliminary tryout and review of this structure suggest that it has potential use in: stimulating people to realize the importance of having information about educational outcomes; stimulating people to think more systematically and concretely about what they are trying to accomplish in their institutions and programs (and for whom); helping institutional officials to identify educational needs, develop goals, translate goals into more concrete objectives, plan for outcomes, elevate the institution and its program; and improving communications with clientele and concerned publics. One of the projects used to try out the NCHEMS Outcomes Structure is reported. It was conducted in the winter of 1977 by the University of Colorado at Boulder. (Author/SPG)

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USING THE NCHEMS OUTCOMES STRUCTURE TO TEST THE ADEQUACY OF OUTCOMES LISTS: TRYOUT AT A STATE UNIVERSITY[a]

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[a]Paper presented at the 1978 Annual Meeting of the Association for the Study of Higher Education; Chicago, Illinois; March 1978.

USING THE NCHEMS OUTCOMES STRUCTURE TO TEST THE ADEQUACY OF OUTCOMES LISTS: TRYOUT AT A STATE UNIVERSITY

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All of the major activities conducted by administrators, faculty, and other professional staff members at postsecondary institutions are, presumably, aimed in some way toward bringing about "educational outcomes." In this "age of accountability," college administrators and others have become especially concerned about concretely identifying and understanding the impacts of their institution on students, the community, and society. After two years of concentrated effort, the National Center for Higher Education Management Systems (NCHEMS) developed an "outcomes structure," a new system for organizing outcomes and outcomes information for purposes of classification, analysis and decision-making (Lenning, Lee, Micek, and Service, 1977). Preliminary tryout and review of this structure suggests that it has potential use in: (1) stimulating people to realize the importance of having information about educational outcomes; (2) stimulating people to think more systematically and concretely about what they are trying to accomplish in their institutions and programs (and for whom); (3) helping institutional officials to identify educational needs, develop goals, translate goals into more concrete objectives, plan for the outcomes, evaluate the institution and its programs; and (4) improving communication about outcomes with clientele and concerned publics; and so forth (for example, several students and student personnel administrators interviewed at a couple of small colleges felt that the Structure could also be used to assist students in planning what they want to accomplish for themselves during college).

This is a report of one of the projects used to try out the NCHEMS Outcomes Structure in a preliminary way. It was conducted in the winter of 1977 by the

University of Colorado at Boulder. Over a period of several years, through surveys and interviews of important clientele groups, several extensive lists of intended outcomes were developed by staff of the Office of the Vice Chancellor for Academic Affairs on the Boulder Campus that were comprehensive for their planning needs. The NCHEMS Outcomes Structure was applied to these lists in a way that would reveal the adequacy of the coverage of those lists--using step-by-step procedures that had been developed at NCHEMS (Lenning, 1977). This process revealed several outcomes areas considered to be important that had been overlooked in developing the lists. The lists were modified, along with the Freshman Questionnaire which had been based in part on the lists. The remainder of this paper will go into detail about this project and its results.

THE NCHEMS OUTCOMES STRUCTURE

The purposes of the Outcomes Structure have been outlined in the introduction to the paper. The Structure consists of three dimensions along which outcomes or information about outcomes can be placed and related to one another. The structure is based on a conceptual framework that defines six attributes of educational outcomes in postsecondary education plus five other factors that are important for understanding particular outcomes (Lenning, Micek, and Service, 1978; Lenning, Lee, Micek, and Service, 1979). The three dimensions of the structure are described below:

- Audience -- The "audience" dimension focuses on who or what receives or is affected by the outcome of concern, or is intended to receive or be affected by it. It has five broad categories, and subcategories for them, as outlined in Figure 1.

o Type of Outcome -- The "type-of-outcome" dimension focuses on whether the outcome results in maintenance (stabilization, reproduction, or preservation) or change (reorganization, modification, revision, or replacement), and on the basic entity within the audience that is maintained or changed. This dimension also has five broad categories, and each is subdivided into categories and subcategories of increasingly more detail and specificity, as outlined in Figure 2. Standard definitions are provided for every category and subcategory of this dimension, along with illustrative examples of outcomes measures and indicators for each.

o Time -- The "time" dimension focuses on when the outcome is expected to or does occur, and on how long the outcome persists. The categories and subcategories for the "time" dimension that are deemed most appropriate vary, depending on the audience of concern, on the philosophy of the person using the Structure, and on the context in which the Structure is being used. (For example, its use at the institution-wide level may very well require different time categories than its use at the institutional program level.) To illustrate this, two quite different student outcome sets of categories that could be used for the "time" dimension are shown in Figures 3 and 4. The one presented in Figure 4, is the time classification used by the University of Colorado at Boulder to follow the chronological path taken by new freshmen through their educational careers. Identification of the times when different data should be collected is valuable in planning.

Figure 1

CATEGORIES AND SUBCATEGORIES OF THE AUDIENCE DIMENSION OF THE NCHEMS OUTCOMES STRUCTURE[a]

10. *Individual/Group Clients*—This category refers to persons or groups of persons who are direct clients of the postsecondary education unit of concern and/or their immediate associates, such as family and relatives or peers.

    11. *Students*—Individuals or groups of individuals who currently are enrolled in the program, institution, or system of postsecondary education.

    12. *Former Students*—Individuals or groups of individuals who formerly were enrolled in the program, institution, or system of postsecondary education.

    13. *Family and Relatives of Students or Former Students*

    14. *Peers and Associates of Students or Former Students*

    15. *Faculty*

    16. *Staff Other than Faculty*

    17. *Other Individual/Group Clients*—An example would be an individual who is none of the above but is served by an advisory service offered by the college.

20. *Interest-Based Communities*—This category refers to large groups that are identified as entities working toward a *well-defined interest or mission.*

    21. *Private Enterprise Communities*—Communities where a major purpose is financial remuneration and profit—for example, corporations, small businesses, and farmers.

    22. *Association Communities*—Communities where members belong on the basis of affiliation rather than employment, such as unions and professional societies.

    23. *Government Communities*—Communities designed to administer government regulations and services, such as city hall, state department of education, and legislative communities.

    24. *Nongovernmental/Public Service Communities Other than the Institution Producing the Outcome*—Nonprofit service organizations, such as schools, hospitals, welfare agencies, philanthropic foundations, colleges (other than the college producing the outcome), and research organizations.

    25. *Institution or Institutional Unit Producing the Outcome*—The postsecondary education institution and/or units within that institution that are perceived as the producer/facilitator of the outcome(s) of concern.

    26. *Other Interest-Based Communities*—An example would be an ad hoc coalition task force of representatives from two or more of the above areas.

30. *Geographic-Based Communities*—This category refers to large groups defined on the basis of *functional territorial boundaries.*

    31. *Local Community*—A township, city, county, metropolitan area or other type of locality having particular boundaries. It is not necessarily restricted to the legal or jurisdictional boundary, but the functional one in which the impact of the institution is (or should be) directly and physically felt. The boundaries will vary with the institution/program and outcome of concern.

    32. *The State*

    33. *A Region*—An aggregation of states or parts of states.

    34. *The Nation*

    35. *An International Community*

    36. *Other Geographic-Based Communities*—An example would be a research discovery that affects primarily people living in the coldest latitudes, or where it snows heavily.

40. *Aggregates of People*—This category refers to subpopulations of people *distinguished by particular characteristics that may indicate common concerns, needs or wants*, but who do not necessarily have a common interest or mission, and therefore do not constitute communities.

    41. *Ability Level Subpopulations*—Subpopulations defined according to level of ability/proficiency on general intellectual functioning or specific skills—for example, gifted, typical, disadvantaged, or skilled, semi-skilled, unskilled.

    42. *Age Subpopulations*

    43. *Educational Level Subpopulations*

    44. *Income Level Subpopulations*

    45. *Occupation Subpopulations*

    46. *Physical Disability Condition Subpopulations*

    47. *Race Subpopulations*

    48. *Sex Subpopulations*

    49. *Other Such Aggregates*

50. *Other Audiences*—Examples would be the natural environment that is affected by university-sponsored research (which in turn would be expected to have impacts on audiences such as individuals and communities) and populations of animals (such as the animals affected by efforts to keep depleted species from becoming extinct or by the development of veterinary medicines).

[a]Reprinted from Lenning, Lee, Micek, and Service (1977), page 24.

Figure 2

FOCUS CATEGORIES AND SUBCATEGORIES IN THE TYPE-OF-OUTCOME DIMENSION OF THE NCHEMS OUTCOMES STRUCTURE[a]

Category Code Number	Entity Being Maintained or Changed
1000	*ECONOMIC OUTCOMES*
1100	Economic Access and Independence Outcomes
1110	Economic Access
1120	Economic Flexibility, Adaptability, and Security
1130	Income and Standard of Living
1200	Economic Resources and Costs
1210	Economic Costs and Efficiency
1220	Economic Resources (including employees)
1300	Economic Production
1310	Economic Productivity and Production
1320	Economic Services Provided
1400	Other Economic Outcomes
2000	*HUMAN CHARACTERISTIC OUTCOMES*
2100	Aspirations
2110	Desires, Aims, and Goals
2120	Dislikes, Likes, and Interests
2130	Motivation or Drive Level
2140	Other Aspirational Outcomes
2200	Competence and Skills
2210	Academic Skills
2220	Citizenship and Family Membership Skills
2230	Creativity Skills
2240	Expression and Communication Skills
2250	Intellectual Skills
2260	Interpersonal, Leadership, and Organizational Skills
2270	Occupational and Employability Skills
2280	Physical and Motor Skills
2290	Other Skill Outcomes
2300	Morale, Satisfaction, and Affective Characteristics
2310	Attitudes and Values
2320	Beliefs, Commitments, and Philosophy of Life
2330	Feelings and Emotions
2340	Mores, Customs, and Standards of Conduct
2350	Other Affective Outcomes
2400	Perceptual Characteristics
2410	Perceptual Awareness and Sensitivity
2420	Perception of Self
2430	Perception of Others
2440	Perception of Things
2450	Other Perceptual Outcomes
2500	Personality and Personal Coping Characteristics
2510	Adventurousness and Initiative
2520	Autonomy and Independence
2530	Dependability and Responsibility
2540	Dogmatic/Open-Minded, Authoritarian/Democratic
2550	Flexibility and Adaptability
2560	Habits
2570	Psychological Functioning
2580	Tolerance and Persistence
2590	Other Personality and Personal Coping Outcomes
2600	Physical and Physiological Characteristics
2610	Physical Fitness and Traits
2620	Physiological Health
2630	Other Physical or Physiological Outcomes
2700	Status, Recognition, and Certification
2710	Completion or Achievement Award
2720	Credit Recognition
2730	Image, Reputation, or Status
2740	Licensing and Certification
2750	Obtaining a Job or Admission to a Follow-up Program
2760	Power and/or Authority
2770	Job, School, or Life Success
2780	Other Status, Recognition, and Certification Outcomes
2800	Social Activities and Roles
2810	Adjustment to Retirement
2820	Affiliations
2830	Avocational and Social Activities and Roles
2840	Career and Vocational Activities and Roles
2850	Citizenship Activities and Roles
2860	Family Activities and Roles
2870	Friendships and Relationships
2880	Other Activity and Role Outcomes
2900	Other Human Characteristic Outcomes
3000	*KNOWLEDGE, TECHNOLOGY, AND ART FORM OUTCOMES*
3100	General Knowledge and Understanding
3110	Knowledge and Understanding of General Facts and Terminology
3120	Knowledge and Understanding of General Processes
3130	Knowledge and Understanding of General Theory
3140	Other General Knowledge and Understanding
3200	Specialized Knowledge and Understanding
3210	Knowledge and Understanding of Specialized Facts and Terminology
3220	Knowledge and Understanding of Specialized Processes
3230	Knowledge and Understanding of Specialized Theory
3240	Other Specialized Knowledge and Understanding
3300	Research and Scholarship
3310	Research and Scholarship Knowledge and Understanding
3320	Research and Scholarship Products
3400	Art Forms and Works
3410	Architecture
3420	Dance
3430	Debate and Oratory
3440	Drama
3450	Literature and Writing
3460	Music
3470	Painting, Drawing, and Photography
3480	Sculpture
3490	Other Fine Arts
3500	Other Knowledge, Technology, and Art Form Outcomes
4000	*RESOURCE AND SERVICE PROVISION OUTCOMES*
4100	Provision of Facilities and Events
4110	Provision of Facilities
4120	Provision or Sponsorship of Events
4200	Provision of Direct Services
4210	Teaching
4220	Advisory and Analytic Assistance
4230	Treatment, Care, and Referral Services
4240	Provision of Other Services
4300	Other Resource and Service Provision Outcomes
5000	*OTHER MAINTENANCE AND CHANGE OUTCOMES*
5100	Aesthetic-Cultural Activities, Traditions, and Conditions
5200	Organizational Format, Activity, and Operation
5300	Other Maintenance and Change

[a]Reprinted from Lenning, Lee, Micek, and Service (1977), page 27. The fourth-level Categories, into which any of the categories listed here can be divided, are "maintenance" (a fourth digit of "1") and "change" (a fourth digit of "2").

Figure 3

ONE POSSIBLE SET OF STUDENT OUTCOME CATEGORIES FOR THE TIME DIMENSION[a]

10. Short-Duration Outcomes	
11. Short-duration outcomes appearing at or prior to graduation	12. Short-duration outcomes appearing after graduation

20. Long-Duration Outcomes	
21. Long-duration outcomes appearing at or prior to graduation	22. Long-duration outcomes appearing after graduation

[a]Reprinted from Lenning, Lee, Micek, and Service (1977), page 29.

Figure 4

TAXONOMY OF TIMES TO CONSIDER FOR COLLECTING UNDERGRADUATE STUDENT OUTCOMES DATA USING SURVEY QUESTIONNAIRES[a]

100 Data from Lower Division Students

- 110 Data from Freshmen Students
  - 111 Data collected Prior to Fall Registration
  - 112 Data collected One Month Following the First Day of Classes in the Fall
  - 113 Data collected One Month Prior to First Semester Final Exams
  - 114 Data collected One Month After Spring Semester Classes Begin
  - 115 Data collected One Month Prior to Spring Semester Final Exams
  - 116 Other, For Example, In the Middle of the Summer Term
- 120 Data From Sophomore Students
  - 121 Data Collected Prior to Fall Registration
  - 122 Data Collected One Month Following the First Day of Classes in the Fall
  - 123 Data Collected One Month Prior to First Semester Final Exams
  - 124 Data Collected One Month After Spring Semester Classes Begin
  - 125 Data Collected One Month Prior to Spring Semester Final Exams
  - 126 Other, For Example, In the Middle of the Summer Term

200 Data From Upper Division Students

- 210 Data From Junior Students
  - 211 Data collected Prior to Fall Registration
  - 212 Data collected One Month Following the First Day of Classes in the Fall
  - 213 Data collected One Month Prior to First Semester Final Exams
  - 214 Data collected One Month After Spring Semester Classes Begin
  - 215 Data collected One Month Prior to Spring Semester Final Exams
  - 216 Other, For Example, In the Middle of the Summer Term
- 220 Data From Senior Students
  - 221 Data Collected Prior to Fall Registration
  - 222 Data Collected One Month Following the First Day of Classes in the Fall
  - 223 Data Collected One Month Prior to First Semester Final Exams
  - 224 Data Collected One Month After Spring Semester Classes Begin
  - 225 Data Collected One Month Prior to Spring Semester Final Exams
  - 226 Other, For Example, In the Middle of the Summer Term

300 Data from Alumni

- 310 Data Collected at Graduation
- 320 Data Collected One Year After Graduation
- 330 Data Collected Five Years After Graduation
- 340 Other, For Example, Data Collected 20 Years After Graduation

400 Other, For Example, Data Collected After Students Have "Dropped Out"

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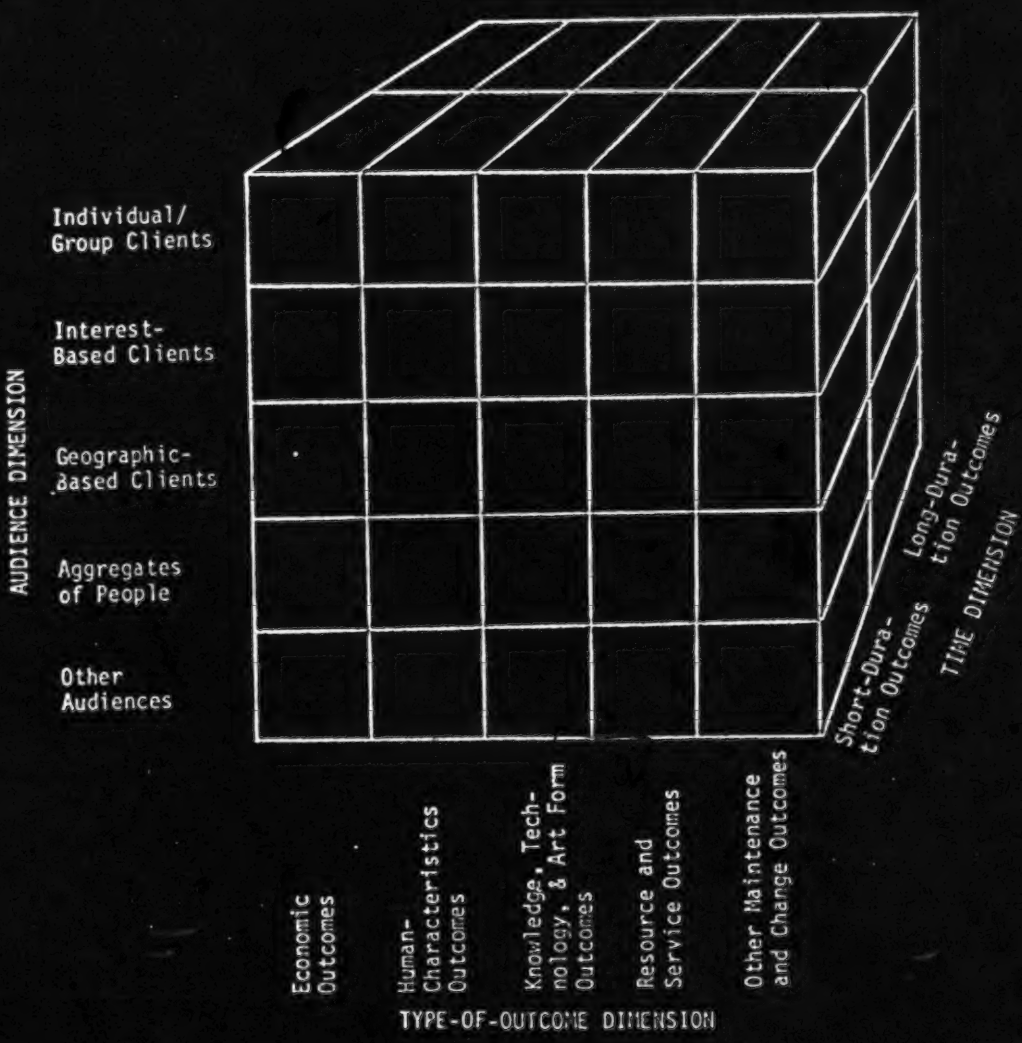
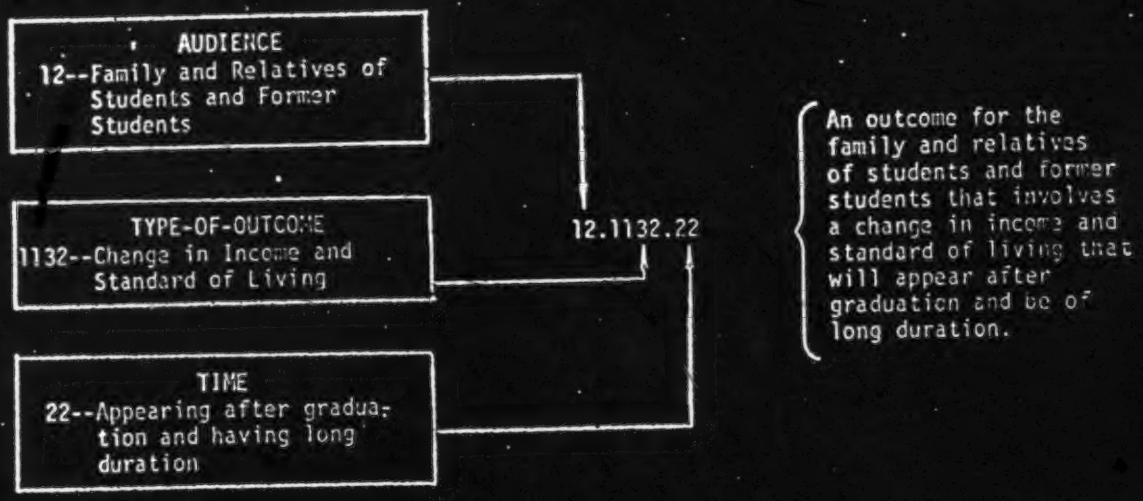
[a]Reprinted from Lenning (1977), page 8. These categories and subcategories are based specially on the data collection experiences of staff in the Office of the Vice Chancellor for Academic Affairs at the University of Colorado, Boulder. Therefore, they may not be entirely appropriate for other postsecondary institutions.

When the three dimensions are put together, they can be pictured graphically as a three dimensional series of cubes formed by the categories for one of the dimension intersecting each of the categories of the other two dimensions. This is illustrated below for the broadest categories of each dimension.



It is illustrated at a more detailed outcome category level as follows, using the category code numbers shown in Figures 1-3:


AUDIENCE
12--Family and Relatives of Students and Former Students
TYPE-OF-OUTCOME
1132--Change in Income and Standard of Living
TIME
22--Appearing after graduation and having long duration
12.1132.22
An outcome for the family and relatives of students and former students that involves a change in income and standard of living that will appear after graduation and be of long duration.

When the dimensions are combined at the level of detail illustrated above, they provide several thousand distinct "cells". The categories within the Structure are believed to cover the full range of possible audiences and types of outcomes, and procedures are provided for subdividing to even more detailed subcategories than provided by the Structure. Thus, when all of the outcomes in a list are categorized using the Structure and step-by-step procedures for this purpose, areas of the Structure that have no outcomes assigned to them (or fewer than expected or wanted) become readily apparent. Then, if desired, specific priority outcomes for those areas that seem lacking can be generated using another set of procedures that have been developed. This, in summary, is the process that was used in this tryout of the Structure.

THE UNIVERSITY OF COLORADO OUTCOMES LIST AND ITS DEVELOPMENT

The Student Outcomes Planning Model is a descriptive model that identifies the relevant features of a student's educational environment and experience. These features are considered valuable educational expectations by students and the academic community. The Model is used to guide the collection of information on students that will help in the planning and management functions of an institution.

This Model[1] helped guide the development of the outcomes list used by the University and is based on the notion that information about students is useful in planning and management. In addition to institutional inputs (such as library books, facilities) and student inputs (such as ability), the educational process and its environment are the important variables which can be altered to produce beneficial educational outcomes (such as employment skills, grade point average). These institutional and student inputs could be combined in different educational processes to produce different levels and kinds of outputs. Educational processes include modes and styles of instruction and course curriculum. The Model evolved at the institution in 1975 to assist internal management, to provide information for external accountability, and academic planning. Academic planning includes needs assessment, program development, resource allocation (budgeting), and evaluation.

The Model allows for the systematic collection of student data through the use of surveys. The Model facilitates the coordination of basic student-related questionnaires and the results can be incorporated into a larger, more extensive academic planning model (Meyerson and Banfield, 1955). Other important items of outcomes information which are available through institutional records (for example, college entrance exam scores and undergraduate grade point average) are not included. The Model is designed to identify those items that must be collected directly from students.

The Student Outcomes Planning Model includes students' background, attitudes, values, aspirations, abilities, and the extent of change in these variables. The Model, shown in Figure 5, consists of four basic questionnaires: 1) Freshman Questionnaire, 2) Exiting Students' Survey, 3) Graduating Students' Questionnaire, and 4) Alumni Survey. The Model allows for longitudinal (cohort) and cross-sectional analysis.

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[1] Developed by Richard L. Harpel and Jean J. Endo

Figure 5

STUDENT OUTCOMES PLANNING MODEL

FOR

THE UNIVERSITY OF COLORADO--BOULDER

FRESHMEN

DEMOGRAPHIC CHARACTERISTICS

- Academic ability
- Financial support

PREVIOUS EDUCATIONAL EXPERIENCES

ASPIRATIONS/EXPECTATIONS/MOTIVATIONS

- Reasons for choosing CU
- Highest degree planned
- Career plans

SELF EVALUATION

- Academic
- Social

CRITICAL THINKING ORIENTATION

GOALS/VALUES

EXITING STUDENTS

TIME OF DEPARTURE

REASONS FOR LEAVING

FINANCIAL SUPPORT

EVALUATION OF UNIVERSITY ENVIRONMENT

- Academic
- Social

UNMET NEEDS

FUTURE PLANS

GRADUATING STUDENTS

ACADEMIC ACHIEVEMENT

- Grade point average
- Degree type
- Basic academic skills
- Critical thinking orientation
- Satisfaction with college experience

CAREER DEVELOPMENT

- Major or field of study
- Highest degree planned
- Importance of job factors
- Satisfaction with college experience

PERSONAL/SOCIAL DEVELOPMENT

- Interpersonal skills
- Personal talents/creativity
- Appreciation for culture
- Understanding different cultures/ideas

EVALUATION OF UNIVERSITY ENVIRONMENT

- Academic
- Social

ALUMNI

OCCUPATIONAL SUCCESS

- Positions held
- Skills required
- Assessment of skills
- Job characteristics
- Flexibility in field changes
- Satisfaction with job
- Satisfaction with college preparation

FURTHER ACADEMIC EXPERIENCES

- Graduate School
- Continuing education
- Military occupational training

COMMUNITY ACTIVITY

- Clubs/organizations

POLITICAL PARTICIPATION

- Elections
- National events/ local activities

CULTURAL INTEREST

- Level of participation
- Breadth of interest

Longitudinal studies involve testing the same students (cohorts) several times in their college career with the same instrument. Questionnaires are given to students as freshmen, exiting students, graduating students, and alumni. The testing of cohorts controls for many external variables such as family background and basic abi ity. Unfortunately, much needed and useful data is not produced early in the process.

Cross-sectional studies includes responses from a sample of students representative of those at different class levels and are measured at the same point in time. Change is inferred by comparison between classes assuming that the students have similar demographic characteristics. Of course, the removal of dropouts would alter the student characteristics. Cross-sectional studies are performed on exiting students, graduating students, and alumni.

The Model is currently in its third year of testing--incorporating both the longitudinal and cross-sectional surveys to determine response differences. It is hoped that within two years the University will be able to minimize the length of the surveys and use only those instruments needed to provide student data necessary for efficient planning and management of campus programs.

The Student Outcomes Planning Model centers around 22 student related goals and their measures which are listed in the Freshman Questionnaire. The relative importance of each goal reflects students' expectations while attending the University. Student interests are an important component of educational planning. Administrators can balance the needs of various student populations and the different preferences of various educational experts. Several measurable objectives from the Higher Education Measures and Evaluation KIT (C. Robert Pace, 1975) were assigned to each goal. For example, the goal "to gain self-confidence: is measured by responses to the following statements: a) "I am a person of worth and on an equal plane with others", b) "My confidence in myself is strong enough so that it doesn't bother me if people don't ike me", c) "I seem to have inner strength in handling things".

In addition to the Pace and Associates KIT, a number of other sources in the literature were referred to in devloping the Model[2] and its associated questionnaires. To date, the Boulder Campus has completed a 1975 Freshman Questionnaire and a 1977 Freshman Questionnaire and is currently developing an Exiting Students' Survey to be completed in 1978. The freshman surveys will be administered every two years to provide descriptive information and establish trends. Trends in measures of objectives are useful in determining whether an outcome is in the desired direction. The exiting survey will compare students who have temporarily or permanently left the institution with those who have remained. It will identify the stopouts, transferouts, and dropouts. It will determine why students leave the campus, the time they left, amount of financial support received, and what their future plans will be.

The Graduating Students' Survey will be administered in 1979. It will include questions that attempt to measure academic achievement, career development, personal/social development, and an evaluation of the University's environment. One year later, the alumni survey will measure occupational success, further academic experiences, community activities, political participation, and cultural interests.

PROCEDURE USED BY THE UNIVERSITY IN THE CLASSIFICATION OF THE ITEMS ON ITS OUTCOMES LIST

The University of Colorado outcomes list was derived in part from the Student Outcomes Planning Model, and in part from other sources. Although the primary focus of the list is on student outcomes, a few outcomes for other audiences are also included, that are not student outcomes but might

[2]Additional sources used in developing the Model were Schalman, et al. (1974), Baird (1967), Baldridge (1971), Bloom (1956), Clapp (1946), Cohen and and March (1974), Fox (1974), Peterson (1973), Richman and Farmer (1974), Trivette (1973), Meyerson and Banfield (1955), and Micek and Arney (1974).

be expected to relate to student outcomes, for example, number of publications by faculty, number of books in the library, and number of events and type sponsored by the departments or universities.

Two of the basic processes developed by the NCHEMS staff for using the Structure were involved in this study. Systematic, straight forward, step-by-step procedures for each of the processes are provided in Lenning (1977). First, process No. 2--classifying outcomes items--was used, to classify all items in the University of Colorado outcomes list. Then Process No. 1 was applied in order to evaluate the adequacy of the list, in terms of whether important outcomes desired by the University community have been left out.

PROCESS NO. 2--CLASSIFYING THE OUTCOMES ON THE LIST

The desired "audience" for classification was determined to be current and graduating students (Code No. 11). First, each outcome on the University of Colorado list was classified in terms of the broadest type-of-outcome categories. Then each was grouped into the more detailed categories at the second and third levels of detail for that dimension of the Structure. Procedures are provided for adding additional levels of detail, using available taxonomies that go into still more detail, for example, Bloom's (1956) taxonomy of the cognitive domain, or using a logical array developed locally. At this University it decided that the third-level Structure categories were adequate for their academic planning purposes.

Table 1 shows the University of Colorado's listing of outcome items (right half of each page) and the Structure categories that each was classified into (left half of each page). It was noticed that a number of Structure categories did not have outcomes list items assigned to them. It was felt that there might be additional outcomes categories to which some outcomes from the list had been assigned so Process No. 1 Procedures followed.

Table 1

THE OUTCOMES LIST ITEMS PLUS THE
STRUCTURE CATEGORY INTO WHICH EACH WAS PLACED

"AUDIENCE"--SENIOR STUDENTS AT CU

NCHEMS Category Code Number	NCHEMS Type-of-Outcome Category Name	Items Included on the University of Colorado Outcomes List
	ECONOMIC OUTCOME (Code 1000) CATEGORIES	
1130	Income and Standard of Living	- Family income
	HUMAN CHARACTERISTIC (Code 2000) CATEGORIES	
2110	Desires, Aims, Goals	- Change in students' goals, desires, aspirations as a result of college
2210	Academic Skills	- Grades earned by students
		- Persistence in college
		- Self report of ability in math, writing, reading and comprehension
2230	Creativity Skills	- Changes in test score that measure originality and creative ability
		- Self-report of development and activity
2250	Intellectual Skills	- Change in students' ability to analyze or solve problems
		- Measure critical thinking activity by developing an "index score"
2270	Occupational Skills	- Demonstrated ability to perform specific tasks
		- Self-report of occupational skills
2310	Attitudes, Values	- Effect of college on attitudes and values
2420	Perception of Self	- Self-confidence measure
		- Expectations
2620	Autonomy and Independence	- Measures of independence
2680	Tolerance and Persistence	- Measures of tolerance and persistence
2710	Completion or Achievement Award	- Graduation diploma
		- Special awards
2740	Licensing and Certification	- Percent passed specific licensing exams

Table 1 (continued)

HUMAN CHARACTERISTIC CATEGORIES (continued)

2750	Obtaining a Job or Admission to a Follow-up Program	- Percent who received jobs - Percent who were accepted to graduate programs
2840	Career and Vocational Roles	- Self-report

KNOWLEDGE, TECHNOLOGY, AND ART FORM OUTCOME (Code 3000) CATEGORIES

3110	Knowledge and Understanding of General Facts and Terminology	- CLEP exam score - Graduate Record Exam score - Self-report
3120	Knowledge and Understanding of General Processes	- Comprehension of general processes and methods - Student grades in a general survey course
3210	Knowledge and Understanding of Specialized Facts and Terminology	- Scores on tests that measure knowledge in specific fields
3220	Knowledge and Understanding of Specialized Processes	- Scores on tests that measure knowledge in specific fields
3310	Research and Scholarship Knowledge and Understanding	- Number of publications by students - Number of publications by faculty
3400	Art Forms and Works	- Specific accomplishments in the arts by discipline or department

RESOURCE AND SERVICE PROVISION OUTCOME (Code 4000) CATEGORIES

4110	Provision of Facilities	- Number of books in library - Number of courts in the Recreation Center - Number and type of computers - Number of keypunch machines
4120	Provision or Sponsorship of Events	- Number of events and type sponsored by departments or university
4210	Teaching	- Handbook on evaluations of specific instructors
4220	Advisory and Analytic Assistance	- Number of advisors available to students - Technical assistance available to students
4230	Treatment, Care, and Referral Services	- Student health center - Mental health facility - Personal counseling - Day care center

PROCESS NO. 1--DEVELOPING OUTCOMES LISTS

Process 1 was used to develop a list of important outcomes irrespective of the current list. Such a list will vary depending upon the values of the planning group making the decision: for example, faculty, students, administrators, legislators. However, an overall institution-wide approach was taken.

The "audience" focus was limited to "current students" in order to limit the scope of Process 1. The five major categories of the type-of-outcome dimension were outlined on a sheet of paper that was titled "audience--currently enrolled students". Then, under each major category, all subcategories at the second and third levels of detail were considered for importance. The detailed subcategories were then used to stimulate thinking about specific outcomes that could be considered "essential" or "important". Aiding in this process for each subcategory were: (1) A product/event/condition typology, (2) a maintenance/chance typology, (3) an output/impact typology, and (4) and an intended-unintended/valued-not valued typology.

Table 2 presents Structure categories left out of the original University of Colorado listing that were identified during this project as important categories for the University and its students. Also included are the specific priority outcomes that were identified for each category.

Table 2

IMPORTANT STUDENT OUTCOMES ITEMS IDENTIFIED
THAT WERE NOT ON THE ORIGINAL
UNIVERSITY OF COLORADO LIST

NCHEMS Category Code Number	NCHEMS Type-of-Outcome Category Name	Items to be Added to the University of Colorado Outcomes List
	ECONOMIC OUTCOME (Code 1000) CATEGORIES	
1120	Economic Flexibility and Independence	- Social Mobility
1130	Standard of Living	- Family assests (other than income)
	HUMAN CHARACTERISTIC OUTCOME (Code 2000) CATEGORIES	
2240	Expression and Communication Skills	- Self-perception of skills in the foreign languages
2260	Interpersonal, Leadership and Organization Skills	- Self-perception of interpersonal and leadership skills
		- Positions held in organizations that require leadership
2630	Dependability and Responsibility	- Self-perception of dependability and responsibility
		- Employer's opinion
2650	Flexibility and Adaptability	- Self-perception of adaptability (other than in job changes)
	KNOWLEDGE, TECHNOLOGY, AND ART FORM OUTCOME (Code 3000) CATEGORIES	
1330	Knowledge and Understanding of General Theory	- Score on tests measuring comprehension of general theories
3230	Knowledge and Understanding of Specialized Theory	- Scores on tests measuring theoretical knowledge in specific fields

CONCLUSION

As a result of this tryout of the NCHEMS Outcomes Structure, some important outcomes information were discovered to have been omitted in the original list. The Structure served as a reminder of the breadth of outcome items associated with each outcome category. For example, the category "Competence and Skills" indicated that Expression and Communication Skills such as skills in the foreign languages were important indicators of entering students' ability. Basic speaking, writing, and reading skills in the English language were considered to be the primary indicators in the orginal outcomes list. As a result, the list and the Freshman Questionnaire were modified.

The final distribution code numbers indicated that the Boulder Campus outcomes list is predominately comprised of human characteristics. This is because the variables in the Model are primarily "student-oriented" outcomes.

In addition, the classification of unique "audiences" will be valuable to the Boulder Campus as the outcomes information is incorporated into reports. A public relations staff can categorize outcomes items that would be useful to particular audiences. For example, research projects completed by graduate students may be of interest to the following audiences: 1) current students, 2) public school districts, 3) industry and business, 4) citizens and policymakers of Colorado. Short executive summaries written for particular audiences can be developed which communicates this information.

The organization which results from the classification into "type of outcome" can help campus leaders and representatives report the outcomes of educational programs more effectively. Information can be stored in computerized student information systems keyed to the NCHEMS classification codes. The classification system can also be used to organize reference materials collected on outcome variables.

REFERENCES

Baird, L.L., The Educational Goals of College-Bound Youth, ACT Research Report, No. 9. Iowa City, Iowa: The American College Testing Program, 1967.

Baldridge, J.V., Power and Conflict in the University. New York: Wiley, 1971.

Bloom, B.S., Taxonomy of Educational Objectives and Cognitive Domain. New York: David McKay, 1956.

Clapp, P.S., "The Objectives of the Four-Year Colleges and Universities of the Northwest Association of Secondary and Higher Schools." Higher Commission of the Northwest Association of Secondary and Higher Schools, 1946.

Cohen, M. and March, J., Leadership and Ambiguity: The American College President. New York: McGraw-Hill, 1974.

Fox, Richard, "University of Colorado, Goals for the Boulder Campus." Unpublished Report, University of Colorado, 1974.

Gross, E. and Gambsch, R.V., University Goals and Academic Power, American Council on Education, Washington, D.C., 1968.

Lenning, O.T., The Outcomes Structure: An Overview and Procedures for Applying It in Postsecondary Education Institutions. Boulder, Colorado: National Center for Higher Education Management Systems, 1977.

Lenning, O.T., Lee, Y.S., Micek, S.S., and Service, A.L., A Structure for the Outcomes of Postsecondary Education, Boulder, Colorado: National Center for Higher Education Management Systems, 1977.

Meyerson, M., and Banfield, E., Politics, Planning, and the Public's Interest, New York: Free Press, 1955.

Micek, Sidney S., and Arney, William R., The Higher Education Outcome Measures Identification Study, National Center for Higher Education Management Systems, at WICHE, November, 1974.

Pace, C. Robert, and Associates, Higher Education Measurement and Evaluation KIT. Revised Edition. Los Angeles: Center for the Study of Evaluation, Graduate School of Education, University of California at Los Angeles, 1975.

Peterson, R., Goals for California Higher Education: A Survey of 116 College Communities. Berkeley: Educational Testing Service, 1973.

Richman, Barry M. and Farmer, Richard N., Leadership, Goals, and Power in Higher Education. San Francisco: Jossey-Bass, 1974.

Schalman, Gary S. et. al., Jefferson County Mountain Area Research Project, University of Colorado at Denver, 1974.

Trivett, David A., "Goals for Higher Education: Definitions and Directions," ERIC/Higher Education Research Report, No. 6, Washington, D.C.: American Association for Higher Education, 1973.